DS1100

Installation Manual

DATALOGIC

DS1100

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DS1100

Ed.: 02/2002

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821000384 (Rev. D)

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GUIDE TO INSTALLATION

The following can be used as a checklist to verify all of the steps necessary for complete installation of the DS1100 scanner.

1) Read all information in the section "Safety Precautions" at the beginning of this manual.

2) Correctly position and mount the scanner for barcode reading according to the information in par. 2.2, 2.4 and 3.4.

3) Provide correct system cabling according to the signals necessary for your application (see all sub-paragraphs under 2.3). See also sub-paragraphs under 2.5 for reference.

4) Install the Configuration Disk.
   Upon successful completion of the installation, the readme.hlp file is opened, giving details about how to get started configuring your scanner.
   See also the Guide To Rapid Configuration link.
   Specific parameter details are available in the Help On Line.

NOTE

Fine tuning of the scanner position for barcode reading can be accomplished using the Test Mode as described in WinHost.

The installation is now complete.

GENERAL VIEW

DS1100

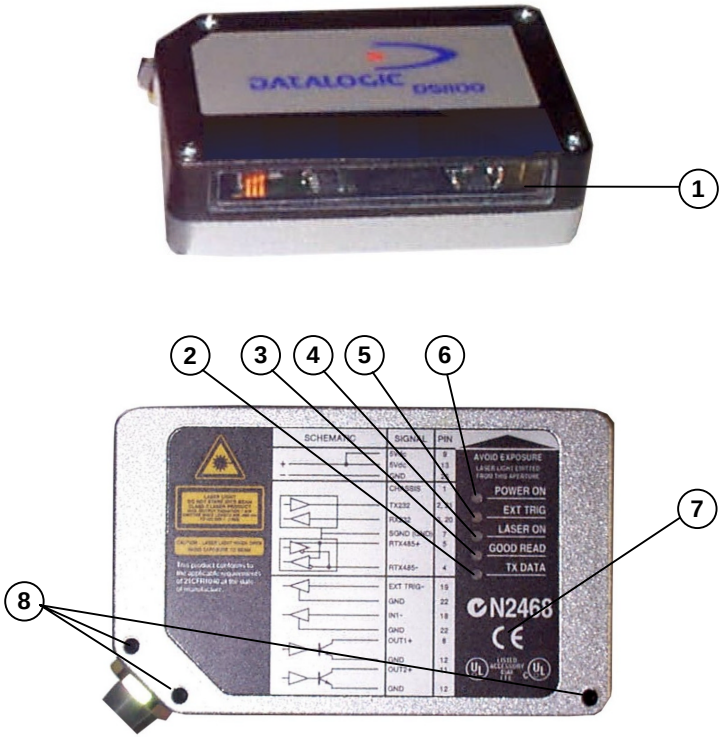


Figure A

1. Laser Beam Output Window
2. TX Data LED
3. Good Read LED
4. Laser On LED
5. Ext Trig LED
6. Power On LED
7. Laser Warning and Device Class Label
8. Mounting Holes

SAFETY PRECAUTIONS

LASER SAFETY

The following information is provided to comply with the rules imposed by international authorities and refers to the correct use of the DS1100 scanner.

Standard Regulations

This scanner utilizes a low-power laser diode. Although staring directly at the laser beam momentarily causes no known biological damage, avoid staring at the beam as one would with any very strong light source, such as the sun. Avoid that the laser beam hits the eye of an observer, even through reflective surfaces such as mirrors, etc.

This product conforms to the applicable requirements of both IEC 825-1 and CDRH 21 CFR 1040 at the date of manufacture. The scanner is classified as a Class 2 laser product according to IEC 825-1 regulations and as a Class II laser product according to CDRH regulations.

There is a safety device which allows the laser to be switched on only if the motor is rotating above the threshold for its correct scanning speed.

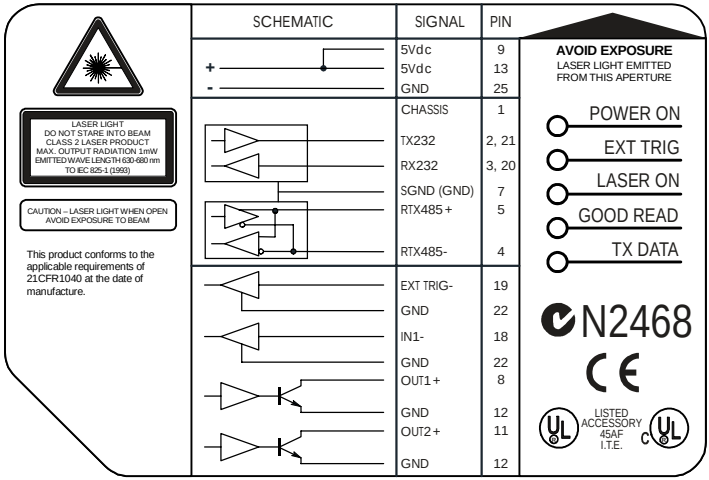
The laser beam can be switched off through a software command (see also «Beam Shutter» in the WinHost Help On Line).

WARNING

Use of controls or adjustments or performance of procedures other than those specified herein may result in exposure to hazardous visible laser light.

The laser light is visible to the human eye and is emitted from the window on the front of the scanner (Figure A, 1).

The warning label indicating exposure to laser light and the device classification is applied onto the body of the scanner (Figure A, 7).



Warning and device class label

For installation, use and maintenance it is not necessary to open the scanner.

The laser diode used in this device is classified as a class 3B laser product according to IEC 825-1 regulations and as a Class IIIb laser product according to CDRH regulations. As it is not possible to apply a classification label on the laser diode used in this device, the following label is reproduced here:

LASER LIGHT
AVOID EXPOSURE TO BEAM
CLASS 3B LASER PRODUCT
MAX. OUTPUT RADIATION 7 mW
EMITTED WAVE LENGTH 630–680 nm
TO IEC 825-1 (1993)

Laser diode class label

Any violation of the optic parts in particular can cause radiation up to the maximum level of the laser diode (7 mW at 630 to 680 nm).

POWER SUPPLY

This device is intended to be supplied by a UL Listed Power Unit with "Class 2" or LPS power source which supplies power directly to the scanner via the 25-pin connector.

1 GENERAL FEATURES

1.1 INTRODUCTION

The DS1100 scanner with decoder offers the best cost-effective solution for demanding industrial applications.

The DS1100 ultra compact dimensions, based on Datalogic experience in miniaturized laser components, have been specifically designed to make the scanner's integration into automated equipment extremely easy.

The Windows-based user-friendly WinHost utility program provided on diskette simplifies the scanner's setup. The DS1100 can also be configured from a Host PC through the Host Mode procedure.

1.2 DESCRIPTION

Some of the main features of DS1100 are listed below:

- miniaturized dimensions, light weight;
- scanning speed: 350 scans/sec;
- raster version available;
- 2 serial communication interfaces: RS232 + RS485;
- reads all popular codes;
- supply voltage: 5 Vdc (4 to 30 Vdc with converter);
- test mode to verify the reading features and exact positioning of the scanner without the need for external tools;
- programmable in 4 different operating modes to suit the most various barcode reading system requirements;
- code verifier;
- programmable input and output signals;
- light source: visible laser diode; the light emitted has a wave length of 630 ~ 680 nm. For laser safety precautions refer to the "Safety Precautions" section at the beginning of this manual;
- low power consumption;
- IP65 protection class of the enclosure; the reader is therefore suitable for industrial environments where high protection against harsh external conditions is required;

The laser beam output window is on the side of the scanner in DS1100-XXX0 models and on the upper part of the scanner in DS1100-XXX1 models, (Figure A, 1).

A security system allows the laser to activate only once the motor has reached the correct rotational speed; consequently, the laser beam is generated after a slight delay from the power on of the scanner.

1.2.1 Indicators

The five LEDs on the scanner indicate the following:

POWER ON (red) indicates the reader is connected to the power supply. (Figure A, 6).

EXT TRIG (yellow) indicates external trigger activity. Refer to par. 2.3.4. (Figure A, 5).

LASER ON (green) indicates laser ON state. (Figure A, 4).

GOOD READ (red) is used to signal the possibility of a successful barcode reading. (Figure A, 3).

TX DATA (green). When blinking, it indicates data transmission. (Figure A, 2).

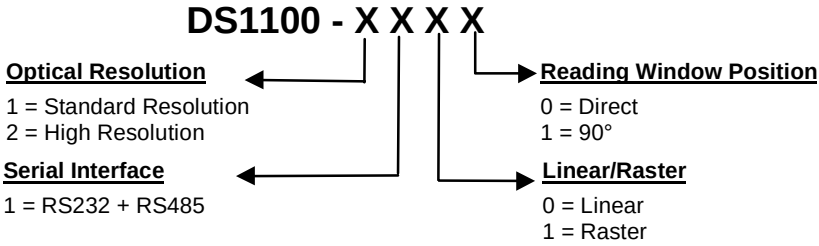
The screw holes on the body of the reader are for mechanical fixture (Figure A, 8).

1.3 AVAILABLE MODELS

The DS1100 scanner is available in versions that differ in regard to the following parameters:

- Resolution.
- Reading window position.
- Linear or raster models.

The following models are therefore available:



The following tables display each version's reading performance.

Version	Max Code Resolution	Speed
	mm (mils)	scans/s
1XXX	0.20 (8)	350
2XXX	0.12 (5)	350

Version	Reading Distance
1XXX	30 mm (1.2 in) - 220 mm (8.7 in) on 0.50 mm (20 mils) codes
2XXX	10 mm (0.4 in) - 110 mm (4.3 in) on 0.30 mm (12 mils) codes

See reading diagrams in par. 3.4 for further details.

1.4 ACCESSORIES

The following accessory is available on request:

DC5-2200: DC converter 4-30 Vdc to 5 Vdc.

2 INSTALLATION

2.1 PACKAGE CONTENTS

Verify that the DS1100 reader and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

- DS1100 reader with cable
- Installation Manual
- DS1100 configuration program disk
- Bar code test chart (PCS = 0.9)
- Mounting kit: - bracket
  - screws

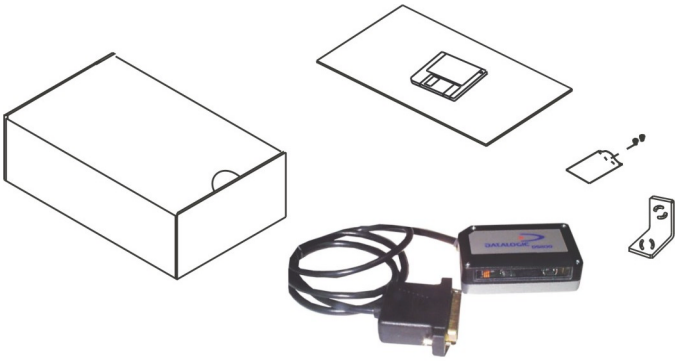
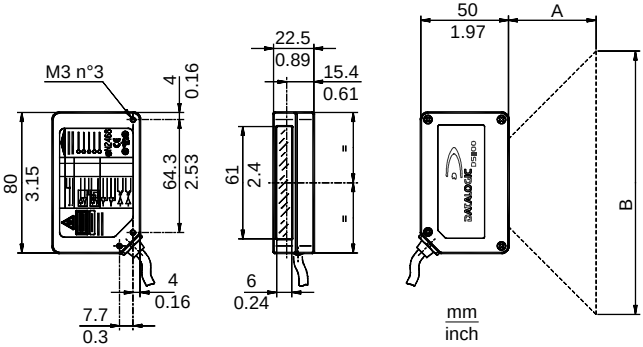


Figure 1 - DS1100 package contents

2.2 MECHANICAL INSTALLATION

DS1100 can be installed to operate in any position.
There are three screw holes (M3 x 5) on the body of the reader for mounting. The diagram below gives all the information required for installation; refer to par. 2.4 for correct positioning of the scanner with respect to the code passage zone.

DS1100



MOUNTING BRACKET

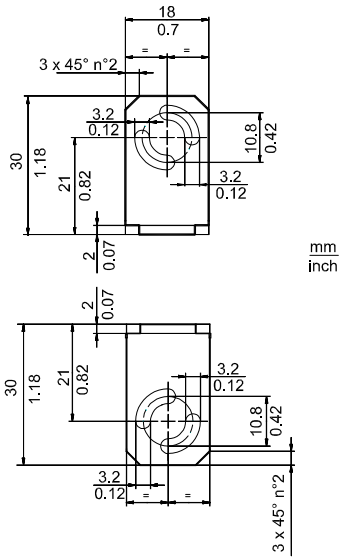


Figure 2 - DS1100 overall dimensions

2.2.1 Reading Position

In DS1100-XXX1 models the laser beam is emitted from the output window with a 12° (± 2) skew angle.

This allows installation with minimum overall dimensions.

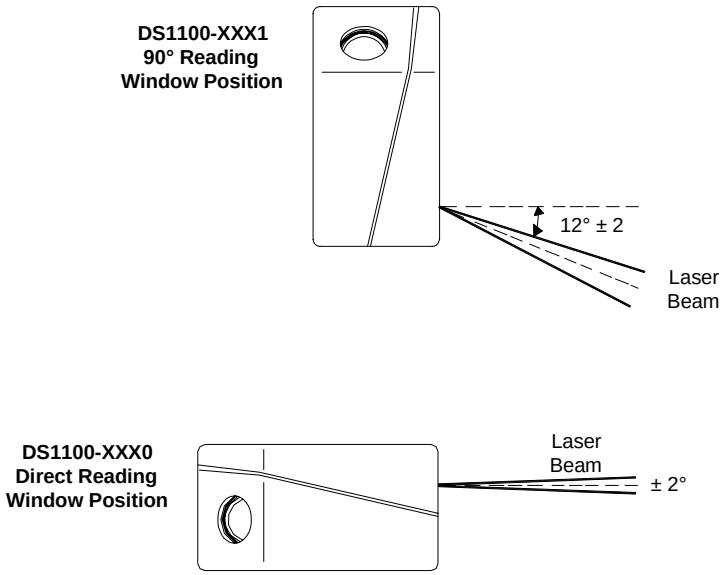


Figure 3 - Reading position

2.3 ELECTRICAL CONNECTIONS

The DS1100 cable is equipped with a 25-pin female D-sub connector for connection with the power supply and input/output signals:

CAUTION

Do not connect GND and SGND to different (external) ground references. GND and SGND are internally connected through filtering circuitry which can be permanently damaged if subjected to voltage drops over 0.8 Vdc.

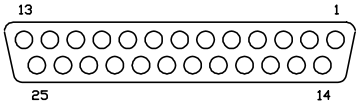


Figure 4 – 25-pin female D-sub connector

25-pin D-sub connector pinout		
Pin	**Name**	**Function**
9,13	VS	Power supply input voltage +
25	GND	Power supply input voltage -
1 *	CHASSIS	Chassis Ground
2, 21	TXAUX	TX RS232 Aux. Interface
3, 20	RXAUX	RX RS232 Aux. Interface
4	RTX485-	RTX- RS485 Main Interface
5	RTX485+	RTX+ RS485 Main Interface
7	SGND	Signal Ground
8	OUT1 +	Output 1 +
11	OUT2 +	Output 2 +
18	IN1 -	Input 1 -
19	EXT TRIG-	External trigger -
12, 22	GND	Input/Output reference
23, 24	N.U.	Not Used
6, 10, 14, 15, 16, 17	NC	Not Connected

* Pins 1 and 25 are connected together internally.

2.3.1 Power Supply

The following pins of the DS1100 connector are used:

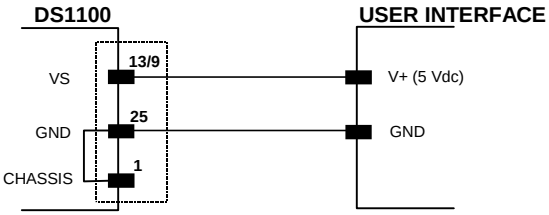


Figure 5 - Power supply connections

The power must be 5 Vdc only.

2.3.2 Main Serial Interface - RS485 Half-Duplex

The RS485 half-duplex interface (3 wires + shield) is used for polled communication protocols.

It can be used for Multidrop connections in a master/slave layout or with a Datalogic Multiplexer, (see par. 2.5.2 and 2.5.3) exploiting a proprietary protocol based on polled mode called MUX32 protocol, where a master device polls slave devices to collect data.

The connector pinout follows:

Pin	Name	Function
5	RTX485+	RS485 transmitted/received data +
4	RTX485 -	RS485 transmitted/received data -
7	SGND	signal ground

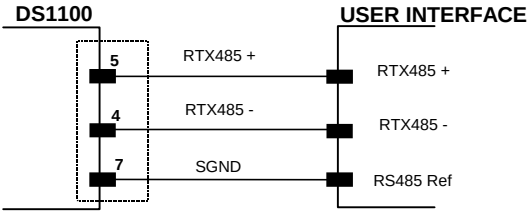


Figure 6 - RS485 half-duplex connections

For this interface type, the Multidrop Address must also be set via serial channel by the WinHost utility or by ESC sequences.

Figure 7 shows an example of a multidrop configuration between a Multiplexer and DS1100 scanners.

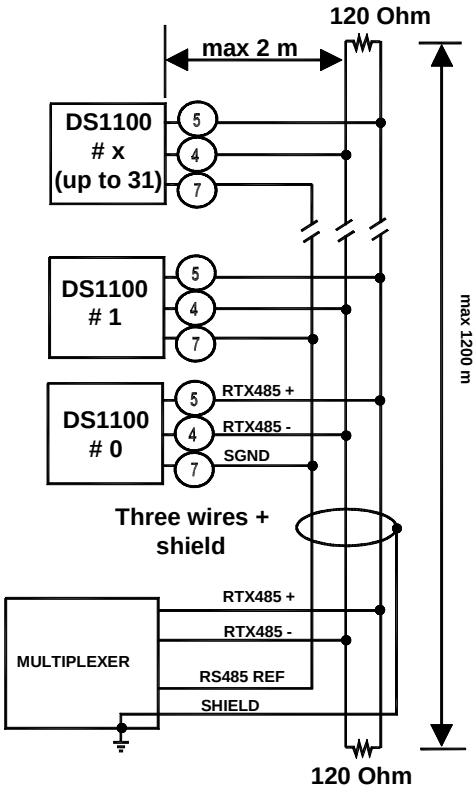


Figure 7 - DS1100 Multidrop connection to a Multiplexer

2.3.3 Auxiliary Interface - RS232

The auxiliary serial interface is used exclusively for RS232 point-to-point connections. It is also used for configuring the DS1100.

The parameters relative to the auxiliary interface (baud rate, data bits, etc.) can be defined using the Winhost utility program or "Host Mode Programming", installed from the diskette.

The following pins of the 25-pin connector are used to connect the RS232 auxiliary interface:

Pin	Name	Function
3, 20	RXAUX	received data
2, 21	TXAUX	transmitted data
7	SGND	signal ground

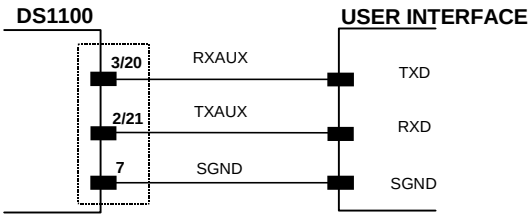


Figure 8 - RS232 auxiliary interface connections

2.3.4 Inputs

The inputs available on the connector supplied with the scanner are indicated below:

Pin	Name	Function
18	IN1 -	input 1 -
19	EXT TRIG-	external trigger -
12, 22	GND	I/O reference

The EXT TRIG input is used to connect the external trigger which tells the scanner to scan for a code. The active state of this input is selected in software. Refer to the Winhost Help On Line.

The yellow LED (Figure A, 5) is on when EXT TRIG- is shorted to GND.

This input is driven by an NPN type command. The connections are indicated in the following diagram:

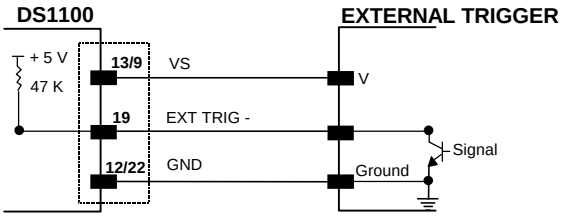


Figure 9 - External Trigger Input command

The general purpose input IN1, in the Standard Application Program, can be used to store the code verifier (see “Store Verifier Hw” in the WinHost Help On Line).

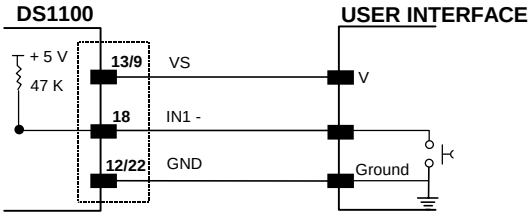


Figure 10 - IN1 - Input command

An anti-disturbance hardware filter is implemented on the External Trigger input (about 1 millisecond delay).

An additional 15 ms (typical) delay can be implemented through a dedicated software parameter (refer to WinHost Help On Line).

2.3.5 Outputs

Two general purpose outputs are available. These outputs can only be connected as open collector configurations. The following pins are present on the 25-pin connector of the scanner:

Pin	Name	Function
8	OUT1+	output 1 +
11	OUT2+	output 2 +
12, 22	GND	I/O reference

The meaning of the two outputs OUT1 and OUT2 can be defined by the user (No Read, Right or Wrong). Refer to the Winhost Help On Line.

By default, OUT1 is associated with the No Read event, which activates when the code signaled by the external trigger is not decoded, and OUT2 is associated with the Right event, which activates when the code is correctly decoded.

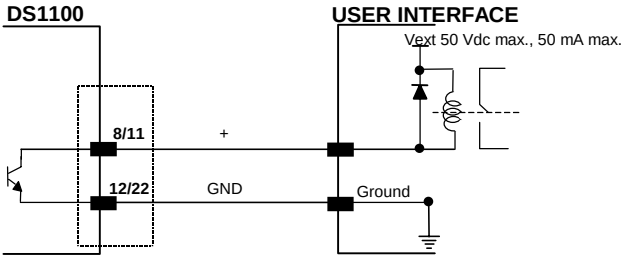


Figure 11 - DS1100 Output connections

These outputs are both level or pulse configurable.

2.4 POSITIONING

The DS1100 scanner is able to decode barcode labels at a variety of angles, however significant angular distortion may degrade reading performance. When mounting the DS1100 take into consideration these three ideal label position angles: **Pitch 0°, Skew 15° to 30° and Tilt 0°**.

Follow the suggestions for the best orientation:

The **Pitch** angle is represented by the value **P** in Figure 12. Position the reader in order to **minimize** the **Pitch** angle.

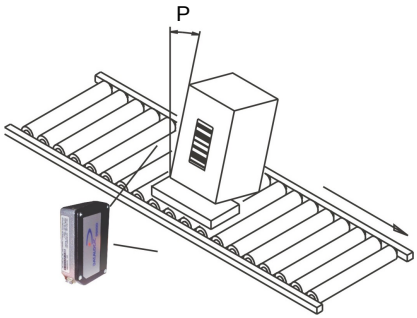


Figure 12 - Pitch Angle

The **Skew** angle is represented by the value **S** in Figure 13. Position the reader to **assure about 15°** for the **Skew** angle. This avoids the direct reflection of the laser light emitted by the DS1100.

For the raster version, this angle refers to the most inclined or external raster line, so that all other raster lines assure **more** than 15° Skew.

For the skew angle value with DS1100 90° versions, refer to par. 2.2.1.

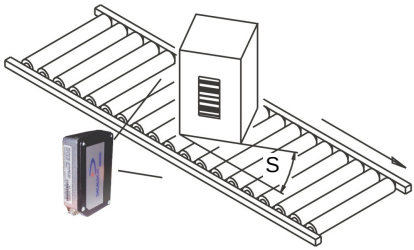


Figure 13 - Skew angle

The **Tilt** angle is represented by the value **T** in Figure 14. Position the reader in order to **minimize** the **Tilt** angle.

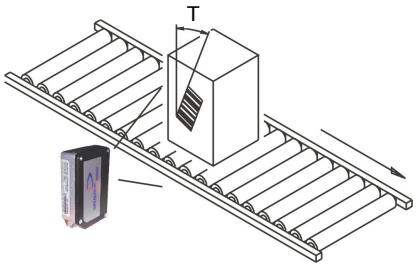


Figure 14 - Tilt angle

2.5 TYPICAL LAYOUTS

The following typical layouts refer to system hardware configurations. Dotted lines in the figures refer to optional hardware configurations within the particular layout.

These layouts also require the correct setup of the software configuration parameters. Complete software configuration procedures can be found in the **Guide To Rapid Configuration** in the WinHost Help On Line.

2.5.1 Point-to-Point

In this layout data is transmitted to the Host on the RS232 Auxiliary serial interface. The Local Echo communication mode must be enabled (default) See the Winhost Help On Line.

When On-Line Operating mode is used, the scanner is activated by an External Trigger (photoelectric sensor) when the object enters its reading zone.

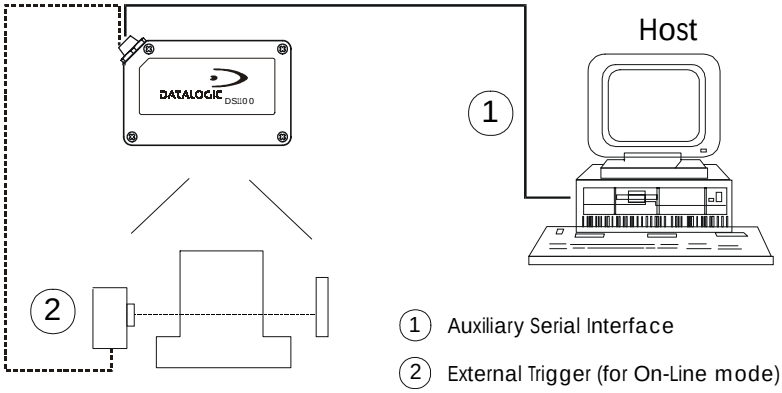


Figure 15 – Point to Point Layout

2.5.2 RS485 Master/Slave

The RS485 master/slave connection is used to collect data from several scanners to build a multi-point or a multi-sided reading system; there can be one master and up to 5 slaves connected together.

The Slave scanners are connected together using the RS485 half-duplex main serial interface. Every slave scanner must have a multidrop address in the range 0-4.

The master scanner is also connected to the Host on the RS232 auxiliary serial interface.

The External Trigger signal is unique to the system; there is a single reading phase and a single message from the master scanner to the Host computer.

It is necessary to bring the External Trigger signal to all the scanners.

The main and auxiliary ports are connected as shown in the following figure.

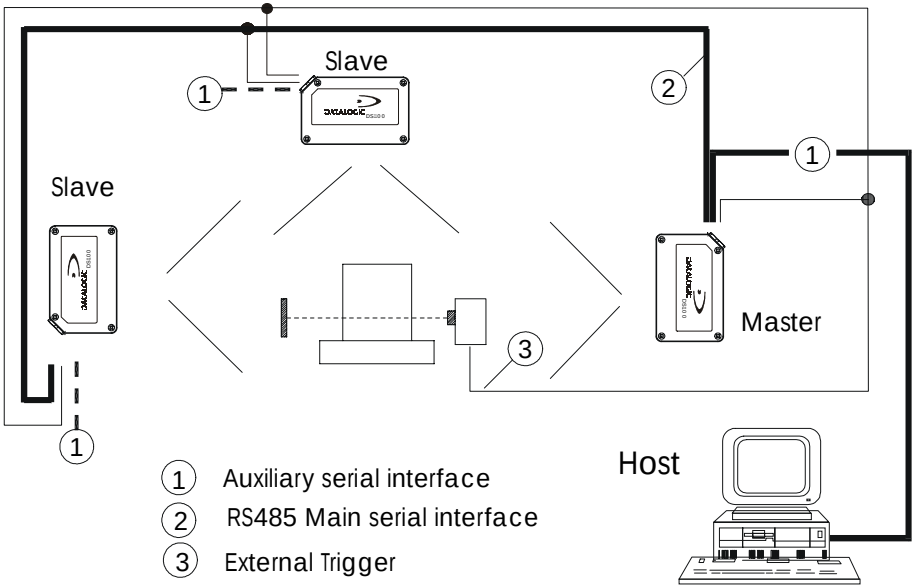


Figure 16 – RS485 Master/slave layout

NOTE

The auxiliary serial port of the slave scanners can be used in Local Echo communication mode to control any single scanner (visualize collected data) or to configure it using the WinHost utility or Host Mode programming procedure.

The termination resistors of the RS485 bus must not be installed.

2.5.3 Multiplexer

Each scanner is connected to a Multiplexer (for example MX4000) with the RS485 half-duplex main interface.

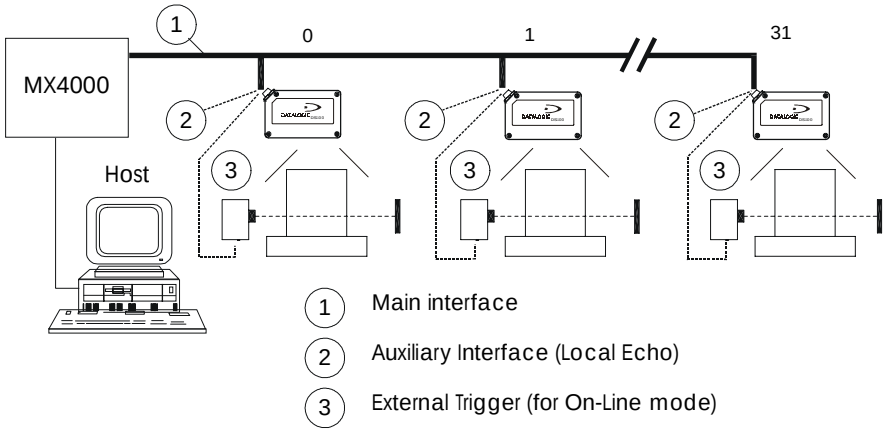


Figure 17 - Multiplexer layout

The auxiliary serial interface can be used in Local Echo mode to control any single scanner (visualize collected data) or to configure it using the WinHost utility or Host Mode programming procedure.

When On-Line Operating mode is used, the scanner is activated by an External Trigger (photoelectric sensor) when the object enters its reading zone.

3 READING FEATURES

The number of scans performed on the code by the DS1100 and therefore the decoding capability is influenced by the following parameters:

- number of scans per second
- code motion speed
- label dimensions
- scan direction with respect to code motion

Typically, 5 scans should be allowed during the code passage to ensure a successful read.

3.1 STEP-LADDER MODE

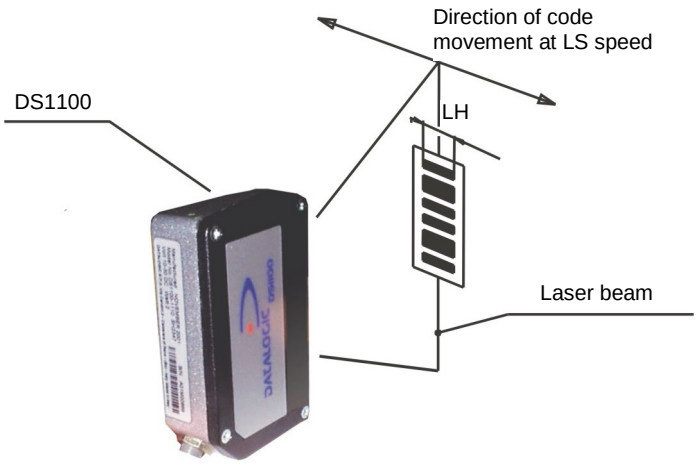


Figure 18 - "Step-ladder" scanning mode

If scanning is perpendicular to the code motion direction (Figure 18), the number of effective scans performed by the reader is given by the following formula:

$$SN = [(LH/LS) * SS] - 2$$

These symbols signify:

SN = number of effective scans
LH = label height (in mm)
LS = label movement speed (in mm/s)
SS = number of scans per second

For example, the DS1100 (350 scans/sec.) for a 25 mm high code moving at 500 mm/s performs:

[(25/500) * 350] - 2 = 15 effective scans.

3.2 PICKET-FENCE MODE

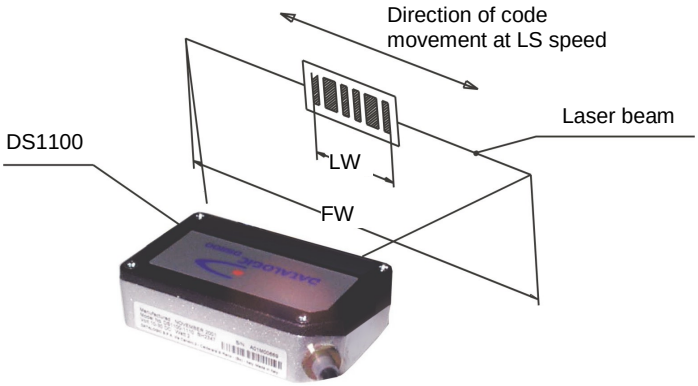


Figure 19 - "Picket-fence" scanning mode

If scanning is parallel to the code motion, (Figure 19), the number of effective scans is given by:

SN = [((FW-LW)/LS) * SS] -2

These symbols signify:

SN = number of effective scans
FW = reading field width (in mm)
LW = label width (in mm)
LS = label movement speed (in mm/s)
SS = scans per second

For example, for a 50 mm wide code moving in a point where the reading field is 180 mm wide at a 1300 mm/s speed, the DS1100 (350 scans per sec.), performs:

[((180-50)/1300) * 350] - 2 = 33 scans

3.3 PERFORMANCE

The DS1100 scanner is available in different versions according to the reading performance.

Version	Max Code Resolution	Speed
	mm (mils)	scans/s
1XXX	0.20 (8)	350
2XXX	0.12 (5)	350

Version	Reading Distance
1XXX	30 mm (1.2 in) - 220 mm (8.7 in) on 0.50 mm (20 mils) codes
2XXX	10 mm (0.4 in) - 110 mm (4.3 in) on 0.30 mm (12 mils) codes

Refer to the diagrams given in par. 3.4 for further details on the reading features. These diagrams are taken on various resolution sample codes at a 25°C ambient temperature, depending on the conditions listed under each diagram.

3.3.1 Raster

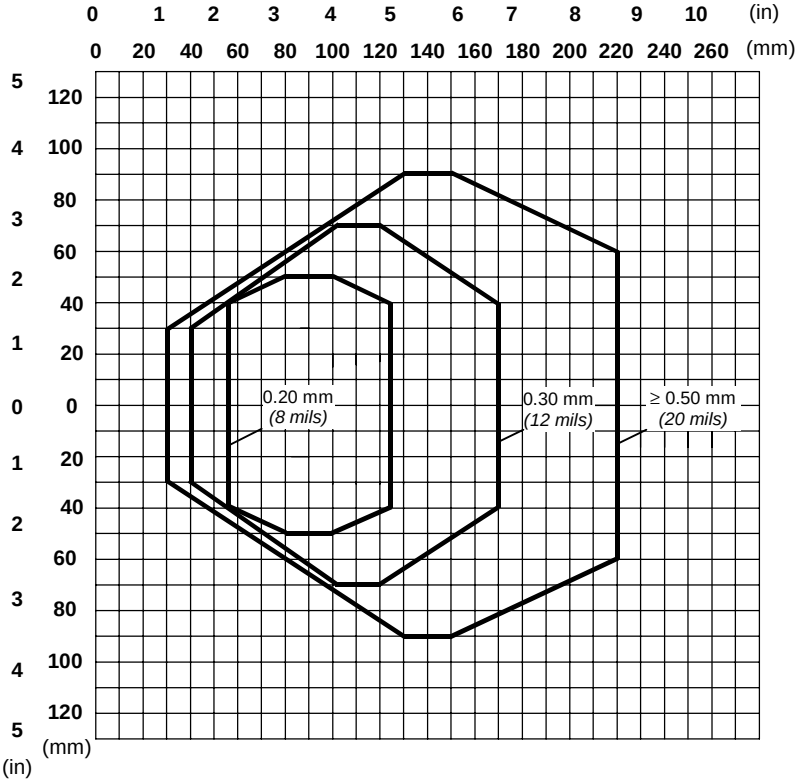
Raster versions are available. If standard devices do not satisfy specific requirements, contact your nearest Datalogic distributor, supplying code samples, to obtain complete information on the reading possibilities.

The max. capture of raster versions is 15 mm (0.6 in) at 220 mm (8.7 in).

3.4 READING DIAGRAMS

The following diagrams show the reading distance for barcodes with different densities.

DS1100-1XXX Standard Resolution

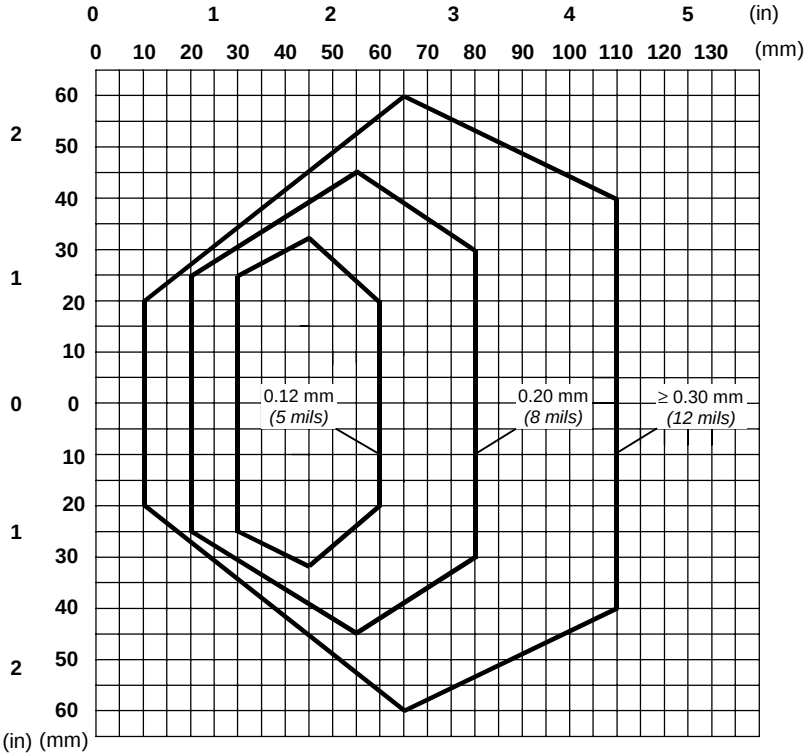


Note: (0,0) is the center of the laser beam output window.

CONDITIONS:

Code	=	Interleaved 2/5 or Code 39
PCS	=	0.90
"Pitch" angle	=	0°
"Skew" angle	=	15°
"Tilt" angle	=	0°

DS1100-2XXX High Resolution



Note: (0,0) is the center of the laser beam output window.

CONDITIONS:

Code	=	Interleaved 2/5 or Code 39
PCS	=	0.90
"Pitch" angle	=	0°
"Skew" angle	=	15°
Tilt" angle	=	0°

4 MAINTENANCE

4.1 CLEANING

Clean the windows periodically for continued correct operation of the reader.

Dust, dirt, etc. on the windows may alter the reading performance.

Repeat the operation frequently in particularly dirty environments.

Use soft material and alcohol to clean the windows and avoid any abrasive substances.

WARNING

Clean the window of the DS1100 when the scanner is turned off or, at least, when the laser beam is deactivated.

5 TECHNICAL FEATURES

	DS1100-1XXX	DS1100-2XXX
ELECTRICAL FEATURES		
Power		
Maximum input voltage	5 Vdc ± 5%	
Power consumption max.	1.5 W	
Serial Interfaces		
Main	RS485 half-duplex	
Auxiliary	RS232	
Baud Rates	150 to 115200 baud	
Inputs	External Trigger; IN1	
Outputs	User-defined OUT1 and OUT2	
V_{CE} max.	50 Vdc	
Collector current max.	50 mA continuous	
V_{CE} saturation	0.3V at 10 mA max.	
Power dissipation max.	200 mW at 40 °C (Ambient temp.)	
OPTICAL FEATURES		
Light source	Semiconductor laser diode	
Wave length (Note 1)	630 ~ 680 nm	
Safety class	Class 2 - IEC 825-1; Class II - CDRH	
READING FEATURES (Note 2)		
Scan rate	350 scans/sec	
Aperture angle	70°	
Max. Reading distance	220 mm, (*8.7 in*)	110 mm (*4.3 in*)
Maximum resolution	0.20 mm (*8 mils*)	0.12 mm (*5 mils*)
USER INTERFACE		
LED indicators	Power On, Good Read, Ext Trig, TX Data, Laser On	

SOFTWARE FEATURES	
READABLE CODE SYMBOLOGIES • EAN/UPC (including Add-on 2 and Add-on 5) • 2/5 Interleaved • Code 39 (Standard and Full ASCII) • Codabar • Code 93 • Code 128 • EAN 128 • Pharmacode Other symbologies available on request.	
CODE SELECTION	up to six different codes during one reading phase
DECODING SAFETY	can enable multiple good reads of same code
HEADERS AND TERMINATORS	up to four headers and four terminators
OPERATING MODES	On-Line, Automatic, Serial-On-Line, Test
CONFIGURATION MODES	• through menus using WinHost utility • receiving commands from one of the serial ports (HOST MODE)
PARAMETER STORAGE	Non-volatile internal EEPROM
ENVIRONMENTAL FEATURES	
Operating temperature (Note 3)	0° to 45 °C (*32° to 113 °F*)
Storage temperature	-20° to 70 °C (*-4° to 158 °F*)
Humidity max.	90% non condensing
Vibration resistance	IEC 68-2-6 test FC 1.5 mm; 10 to 55 Hz; 2 hours on each axis
Shock resistance	IEC 68-2-27 test EA 30G; 11 ms; 3 shocks on each axis
Protection class	IP65
PHYSICAL FEATURES	
Mechanical dimensions	80 x 50 x 22 mm (*3.15 x 1.97 x 0.89 in.*)
Weight without cable	<100 g. *(<3.53 oz.)*

Note 1: The features given are typical at a 25 °C ambient temperature (if not otherwise indicated).

Note 2: Further details given in par. 3.3 and 3.4.

Note 3: If the reader is used for a long period of time in high temperature environments (over 40 °C), use of the Beam Shutter is advised (see the Winhost configuration program).

We

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Bologna - Italy

declare under our sole responsibility that the product(s)

DS1100-XXXX, Laser Scanner and all its models

to which this declaration relates is in conformity with the following standard(s) or other normative document(s)

EN 55022, August 1994: LIMITS AND METHODS OF MEASUREMENTS OF RADIO DISTURBANCE CHARACTERISTICS OF INFORMATION TECHNOLOGY EQUIPMENT (ITE)

EN 50082-2, March 1995: ELECTROMAGNETIC COMPATIBILITY. GENERIC IMMUNITY STANDARD. PART 2: INDUSTRIAL ENVIRONMENT

Following the provision of the Directive(s):

89/336 CEE *AND SUCCESSIVE AMENDMENTS*, 92/31 CEE; 93/68 CEE

Lippo di Calderara, 12/07/1999

Ruggero Cacioppo
Ruggero Cacioppo
Quality Assurance Supervisor